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SCIENCE NEWS LETTER

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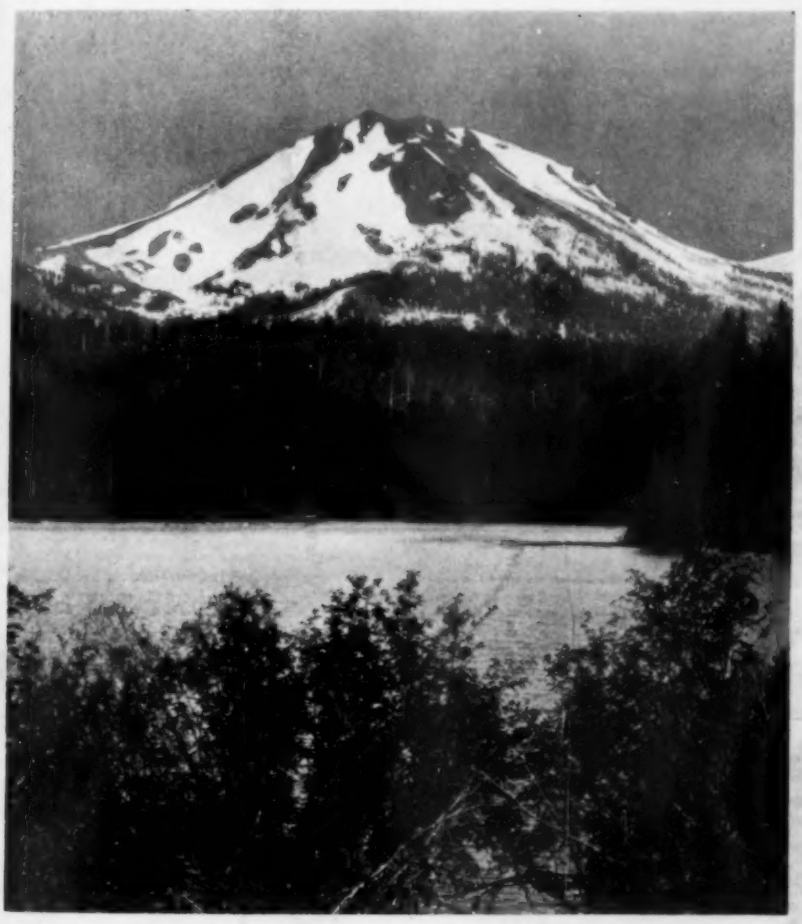
THE WEEKLY SUMMARY OF CURRENT SCIENCE •



MAY 30, 1936

Active Again

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Edited by WATSON DAVIS

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DO YOU KNOW?

The British Museum has received phonograph records of the main dialects of speech in Great Britain.

Thunderstorms are so rare on the Pacific coast that a person living there is likely to experience only one a year.

A "rubber hen" is a new type of brooder which keeps the chicks warm by means of a heated rubber pad against their backs.

If a snake is robbed of its fangs it may grow a new set and recover, or it may starve because of the soreness of its mouth, or die of infection.

Experiments show that fruits put into frozen storage should be cleaned of decay organisms, for some of these molds and bacteria can survive a temperature of 15 degrees Fahrenheit.

Urging that dishes in public eating places be thoroughly cleansed, a public health officer declares that "the hands and mouths of previous patrons, rather than the hands of food handlers, are often the chief source of danger."

It takes at least 30 to 40 leaves on a peach tree to produce food enough to develop a good peach.

Rubber thread is now made from latex, the milk of the rubber tree, in much the same way that rayon is made from cellulose.

An effort is being made to have all musical instruments that are manufactured in the United States conform to a uniform standard pitch.

Cucumbers are vine plants in the United States, but in Africa and some other countries there are cucumber trees, relatives of the common cucumber.

Sodium lamps, with their distinctive golden color and ability to show up moving objects distinctly, are being used to light some dangerous rail crossings.

Forestry experts point out that it pays to cut mature, large trees: there is about 19 times as much lumber in a tree with a 26-inch trunk as in a 9-inch tree, and the lumber is worth more per foot, bringing the value up to 36 times that of wood from the 9-inch tree.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

ANTHROPOLOGY

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ARCHAEOLOGY

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ASTRONOMY

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Which is the brightest object in the evening sky in June? p. 350.

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Are paints subject to sunburn? p. 348.

ENTOMOLOGY

Are grasshoppers expected to menace crops this season? p. 346.

What are the seven ages of a butterfly? p. 348.

GENERAL SCIENCE

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GEOGRAPHY

When did a ship first negotiate the entire Northeast Passage in one navigating season? p. 343.

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Which is the oldest science? p. 354.

NAVIGATION

How has aerial navigation been simplified? p. 352.

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PHYSICS

Can code messages be sent by invisible light waves? p. 347.

Is it merely sentiment that gives value to a $10,000 violin? p. 349.

PHYSIOLOGY

Are the brain waves of identical twins alike in pattern? p. 346.

How do the ductless glands secrete their chemicals? p. 353.

Where is the blood supply created? p. 345.

PSYCHIATRY

What punishment has been urged for those who seek to rule hospitals for mental disease by politics? p. 352.

PUBLIC HEALTH

What has a curator of mollusks at the Smithsonian Institution to do with public health in Japan? p. 346.

SEISMOLOGY

How may earthquakes be classified? p. 348.

VOLCANOLOGY

Does the United States have a live volcano? p. 348.

ZOOLOGY

Where were quintuplet lion cubs born? p. 349.

ASTRONOMY

Predict New Comet Will Become Visible in July

Early Risers, Though They Have No Telescope May See Peltier Comet, Brightest Since Visit of Halley's

THE new Peltier comet, discovered on the night of May 14, by an amateur, will in all probability be the brightest since the last appearance of Halley's famous comet in 1910, Harvard astronomers have predicted. It will be easily visible to the naked eye during the latter part of July when it will flash into sight just before dawn each morning. It will be the first comet visible without telescopes since 1927.

The new comet was found near the North Star by Leslie C. Peltier, garage employee of Delphos, Ohio, who has become one of the world's outstanding amateur astronomers.

According to calculations made at the Harvard College Observatory, the comet is now approximately 120,000,000 miles from the earth, but since its discovery its brightness has increased from the ninth to the eighth magnitude. When first sighted it was visible only through telescopes, although low-powered ones picked it up easily, but by the end of July the comet is expected to be brighter than the sixth magnitude and within 20,000,000 miles of the earth. At that time, the Harvard computations indicate, it will begin to recede, slowly fading from sight.

Look This Year

Drs. Fred L. Whipple and Leland E. Cunningham of the Harvard Observatory staff, who made the calculations from photographs taken with the Observatory's cameras, warn that anyone wishing to see the unusual astronomical display had better do so this year for the comet is not expected to return to the vicinity of the earth for several centuries.

The comet is now located in the northern constellation Cepheus. Its position is given by Dr. Harlow Shapley, director of the Observatory, as declination plus 73 degrees, right ascension 23 hours, 45 minutes.

Although it is moving in a south and east direction, it is moving so slowly that it is expected to be in substantially the same position two months from now when it becomes visible to the naked eye. The course of the comet has been tentatively determined as in the shape of an open parabola about the sun. Apparently it never approaches that body any closer than the earth does, about 93,000,000 miles.

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GEOGRAPHY

Transport in Arctic Sea Now a Commonplace Affair

EPICS of action have been written in the Arctic and Antarctic until we stay-at-homes grow a little blasé. But when 30 freighters plow water and ice of the Arctic Sea north of Russia and Siberia this summer, it will be the large-scale opening of the Northeast Passage, tapping the great natural resources of the white arctic continent of the Soviets.

For three centuries explorers attempted to make the Northeast Passage in a single voyage. First to succeed was the Swede, Nordenskiold, who in 1878-9 navigated the ship *Vega* from west to east and finally through Bering Strait.

First to negotiate the entire Northeast Passage in one navigating season (1932) was the ice-breaker *Sibiryakov*, and another ice-breaker, *Lidtike*, repeated in 1934. Last year through voyages were accomplished by ordinary freight vessels, two going from Vladivostok on the Pacific to Murmansk, the western gateway to the Soviet arctic, and two making the reverse passage.

This year, in addition to 30 freight ships plying the Arctic Ocean, four ice-breakers, including the famous *Krassin*, which rescued Nobile in 1928, will patrol the new sea route.

Thus sea transport and regular airline schedules have brought civilization to the Soviet arctic. Cities and farms have appeared where only nomad natives once roamed. To temperate U.S.S.R. are being sent coal, lumber, oil, minerals, fish, furs and other riches of the North.

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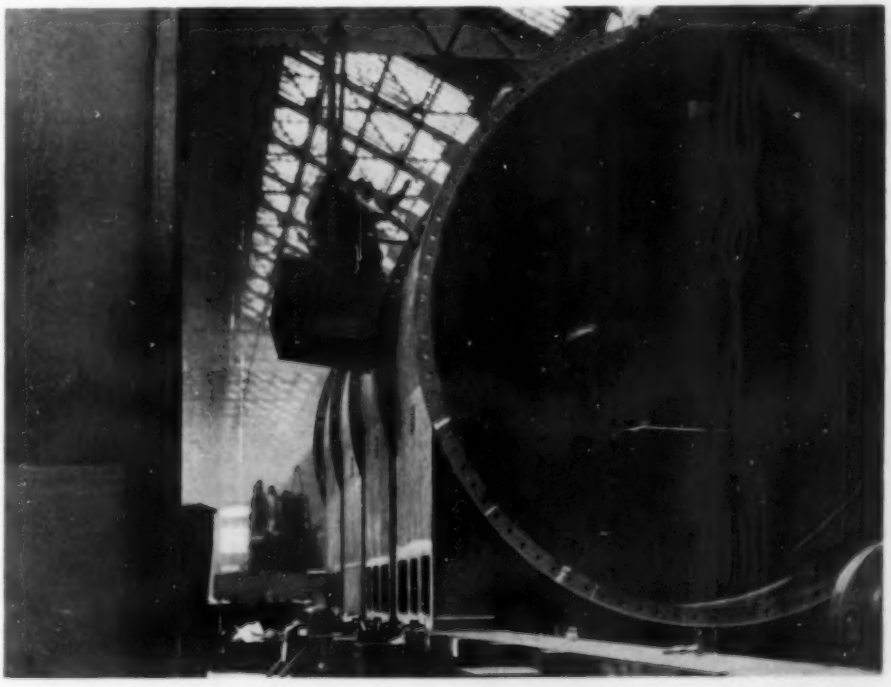

GIANT EQUIPMENT

Staggering in its proportions is this large electrical frequency changer which converts electric power from Boulder Dam at 60 cycles per second to 50-cycle current used by the city of Los Angeles. The photograph was taken while the unit was under construction in the East Pittsburgh shops of the Westinghouse Electric Co. It will soon be ready for shipment.

GENERAL SCIENCE

Doctors Jewett and Kettering Honored With Franklin Medal

Organized Industrial Research and a Stock-Taking of Scientific Unknowns, Urged for Progress of Science

AMERICANS do not have the opportunity of being decorated with European prodigality. For this reason annual medal day of the Franklin Institute in Philadelphia on May 20 brought prized rewards to the chosen scientists, engineers and inventors.

Franklin medals, one of the highest awards in American science, were handed to two men who have speeded modern life. Dr. Frank B. Jewett made it possible to talk telephonically around the world, across continents and seas. Dr. C. F. Kettering made the automobile a more effective and economical machine. "Ket" of General Motors is a leader in automotive engineering which, to quote the medal citation, is "a science out of which has grown the greatest industry in this country, the manufactured product of which has, in only a quarter of a century, changed the face of the civilized world."

Without highly organized industrial research the modern telephone would never have come to its present stage of perfection, Dr. Jewett declared, in acknowledging his honor. He traced the research development of the telephone and its associated arts of the radio and sound motion pictures in an address following the presentation to him of the 1936 Franklin Institute Gold Medal.

From 1880 to 1900, Dr. Jewett pointed out, the telephone grew in industrial stature because its problems were of such a nature—looking back they seem extremely elementary—that they could be solved by uncoordinated individuals working, each for himself, in separate laboratories and by borrowing proved knowledge from the older telegraphic field.

Demanded By Problems

Coordinated, organized research came into being, said Dr. Jewett, when the increased demands for inter-community phone service occurred. Problems of distance transmission arose, unsolved difficulties with interlocking switching facilities sprang up and the central offices had to be redesigned to meet increased volumes of traffic.

Ingenuity for a short while helped, but it soon became apparent that the solutions obtained were becoming increasingly costly.

The final solution came, Dr. Jewett indicated, by a mass attack on the problems from widely different fronts, utilizing knowledge in widely scattered fields. At one stage it was even necessary to go over into physiology and anatomy to learn more about the process of hearing itself.

Dr. Jewett indicated that the medal should be regarded less as a personal honor to him than as a trust for his younger colleagues and associates who have made telephone advances possible by their research. His own job, Dr. Jewett continued, has been to direct these men so that they could develop the maximum of their creative scientific ability.

"It is easy," declared the Bell Telephone Laboratories' president, "for a superior to take or appear to take credit for accomplishments of his younger associates. What is hard is regularly to appear in the role of a critic—an apparent reactionary in the ranks of ardent enthusiasts.

"As I look back over my thirty years of work in this field of applied science, I have a feeling that I may have contributed as much toward advancing the art of electrical communication by what I have prevented being done as in what I have encouraged."

Outline of Ignorance

A stock-taking of the unknown in science was urged by Dr. Kettering.

We need to outline our own ignorance, make a schedule of the things we do not yet know. Then we will be ready to go ahead with scientific discoveries and their practical applications. This, in effect, was what Dr. Kettering told his fellow American scientists in accepting the Franklin medal.

When our thinking becomes self-satisfied, "orthodox," when we become convinced there are some things that "can't be done," then we are in line for trouble, Dr. Kettering said. We were in such a state of mind before 1929, he pointed out. We thought we knew everything there was to know, or at least everything we needed to know.

As soon as we again resolutely recognize the long series of unsolved problems that simply demand to be solved; as soon as we accept the idea that "the problem must be the boss," then we shall be really ready to be on our way again. And when we once get ourselves into that state of scientific mental humility, we shall find, Dr. Kettering concluded, that "American industry is just beginning."

A daring voyage by submarine from Holland to the East Indies is recalled by the medal which will be sent across the sea to Dr. Felix A. Vening Meinesz of Utrecht. He is the acknowledged pioneer in determining gravity at sea.

Aid to blind flying, made possible by instruments—gyroscopic horizon, directional gyro, automatic airplane pilot—is recognized in an award to Elmer A. Sperry, Jr., of Brooklyn.

A way of detecting hidden defects in metals by use of magnetism is acclaimed by medals to Dr. Alfred V. de Forest of New York City and Major William E. Hoke of Baltimore. Planetary milling and threading, which has to do with cutting metal and not with astronomy, won a medal for Peter P-G. Hall of Philadelphia.

Cresson Medal

Juggling molecules and atoms with actual and potential aid to industry won awards of the Elliott Cresson medal for Dr. George O. Curme, Jr., of New York City, and Dr. Robert J. Van de Graaff of Massachusetts Institute of Technology. Dr. Curme has founded a new industrial technology upon synthetic aliphatic compounds, while Dr. Van de Graaff invented the atom-smashing 10,000,000 volt electrostatic generator.

Coal coking improvements won honors for Dr. Joseph Becker of Pittsburgh. Mayo D. Hersey of Brown University was given a medal for lubrication research and Albert L. Marsh of Detroit was honored for a new electrical material.

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Penguins walk in dignity but they also run on "all fours," that is, on wings and legs.

Exploring a very early Egyptian tomb belonging to an Egyptian official of 3500 B.C., archaeologists found 2,000 wine jars among the provisions.

HOW BLOOD IS FORMED

New light on the relation of temperature to the formation of blood was provided at the meeting of the American Medical Association by the exhibit of Drs. Charles B. Huggins (left), W. J. Noonan (right) and B. H. Blocksom, not present in the picture.

PHYSIOLOGY

Warmth Necessary for Working Of Body's Blood Factory

DISCOVERY of a hitherto unknown but fundamental relation between temperature and blood formation was announced at the meeting of the American Medical Association in Kansas City.

The discovery, which may give physicians new leads to the treatment of infections and blood diseases, was made by a group of Chicago surgeons, Drs. Charles B. Huggins, W. J. Noonan and B. H. Blocksom, of the University of Chicago.

The blood factory of the adult body is located in the marrow of certain bones.

This factory cannot operate at low temperatures, it appears from the experiments reported by Dr. Huggins and associates. No blood is made in the marrow of the bones of the hands, feet and lower part of the arms and legs because it is too cold there.

No application of the discovery to disease or its treatment is made by the Chicago surgeons, who are at present content to have found an answer to the question of why the marrow in some bones is the red, blood-forming variety while the marrow of other bones is yellow and forms no blood.

Certain practical aspects suggest themselves, however. New knowledge about the mechanism of blood formation may well be expected to prove helpful in finding the causes and better methods of treating blood diseases.

Fever Useful

This discovery also suggests that it may be a good thing when a sick person has fever because when the temperature goes up it may favor production of more blood and antibacterial substances which the patient needs to fight the infection. Physicians who treat disease by inducing fever, a method demonstrated at the medical meeting, may come to revise their methods as a result of this discovery. Raising the body temperature a slight amount for a week, the discovery suggests, might prove more beneficial than elevating it to a high point for a few hours once or twice a week, as is now the practice.

Discovery of the importance of temperature for blood formation in the bone marrow was made by ingenious experiments which, as Dr. Huggins explained them, seemed so simple that the layman might wonder why no one had thought of them sooner. One reason is that the experiments required the use of modern surgical technic and a modern physical instrument, the thermocouple, which detects small differences in temperature in body tissues.

The red, blood-forming marrow in bones changes abruptly to the yellow variety in the extremities; the sharp line between the two, seen in the specially prepared skeletons of small animals which Dr. Huggins exhibited, suggested that the cause must be physical rather than chemical.

With thermocouples Dr. Huggins and associates measured the temperature of the bones above and below the line of change in marrow color, and found the bones with yellow marrow were definitely colder.

Experimental Proof

Proof of the causal relation of temperature to blood formation was obtained by operations in which the tip of an animal's tail was inserted within its abdomen, or the feet of baby rats were dropped into the abdomens of their mothers. Instead of turning yellow, the marrow of these extremities stayed red and continued to form blood when in the new warmer location within the body.

"Panama temperature" of 96 degrees Fahrenheit is required for blood formation by the bone marrow, the surgeons found.

An exhibit showing how bone marrow makes blood for the body, and how only certain bone marrow is the blood factory in the adult body, was awarded the gold medal of the American Medical Association for its originality and excellence of presentation.

The silver medal of the AMA was awarded to an exhibit demonstrating a new short-cut method of detecting the presence of one form of vitamin B in foods. The exhibitors were Dr. George C. Supplee and A. Ansbacher of the research division of the Borden Company.

The bronze medal went to the exhibit of Dr. Alvan L. Barach of New York City, who is seeking to lower the cost of helium so that the light gas will find wider use in the treatment of asthma.

PUBLIC HEALTH

Discovery Regarding Snails Saves Many Human Lives

IT IS a long way from the nation's capital to Japan, and a long time from 1896 to the present day, but what was an obscure comment in a Washington scientist's notebook four decades ago has freed hundreds of thousands of rice workers in the Orient from the dangers of a baffling illness—schistosomiasis.

Forty years ago some 200,000,000 people in Oriental countries were afflicted with this disease. Often it was fatal. Always it lowered energy and efficiency. Today the number of victims has been cut in half and in areas outside of China the disease is under control.

Dr. Paul Bartsch, veteran curator of mollusks at the Smithsonian Institution, 40 years ago made the notebook comment when studying the snails living in the Potomac River and its small tributaries near Washington. He found that snails in the Potomac proper were quite different from those inhabiting its tributaries; and yet there was no physical barrier to prevent the intermingling of the varieties.

Dr. Bartsch finally found that the relative acidity of the water was the answer. The Potomac was slightly alkaline while its feeding streams were slightly acid. Some kinds of snails could live only in the acid water conditions and others only in the alkaline condition. There was a chemical wall of life and death between the two types.

What had that to do with the Orient and schistosomiasis? The Oriental disease was found to be caused by an organism which was carried in snails as a secondary host. These snails lived in an acid type water. Rice workers, particularly, were stricken with the affliction as they waded in the pools of water with bare feet and legs.

Control was finally achieved by the Japanese by the simple matter of making the water alkaline with the presence of crushed limestone along the banks. The problem was much easier than the control of malaria by preventing the growth of mosquitoes.

This dramatic incident in man's conquest of disease is recalled by the new publication of the Smithsonian Institution on Dr. Bartsch's further extension of his early studies. He has, for years, been systematically studying snails and mollusks and arranging them into their various genera and species.

In his twenty-year study Dr. Bartsch has freed several varieties of snails from possible stigma of being carriers, indirectly, of disease organisms. Others, formerly unsuspected, are now on the "dangerous" list. With such a compilation before him, a health officer can now easily determine the organism which may be responsible for trouble in his vicinity.

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PHYSIOLOGY

Identical Twins Have Same Patterns of Mental Activity

IDENTICAL twins not only have exactly similar features, coloring and size, they also have identical patterns of brain activity.

This has been discovered by study of brain electrograms, the so-called brain waves which give scientists information about brain activity much as the electrocardiogram gives information about heart activity. The study and its far-reaching implications were presented by Dr. Hallowell Davis and Dr. Pauline A. Davis of Harvard Medical School at the meeting of the American Medical Association in Kansas City.

Because they found identical patterns of brain activity in the brain electrograms from eighteen sets of identical twins, the Davises do not believe the similarities are due to chance. The patterns apparently follow a biological law and may be an inborn characteristic.

The studies open up possibilities of learning much about inborn patterns of nervous and mental activity. As the Davis research team puts it, "Here is a key, fashioned by physiology out of radio. Has neurology a lock which the key can open?"

A characteristic brain electrogram for epilepsy was reported at the same session by Drs. F. A. Gibbs, William G. Lennox and Erna L. Gibbs, also of Harvard Medical School. The frontal lobe of the brain is most concerned in epilepsy, these investigators have found, and they predict that it is only a matter of time until scientists will locate the exact spot in the brain where epileptic seizures start.

New Vitamin D

A new vitamin D with rickets-preventing power has been obtained from plants, Dr. Charles E. Bills of Evansville, Ind., reported at a special session on vitamins. This vitamin D was obtained by irradiating a provitamin from sitosterol, the substance in plants which corresponds to cholesterol in animals. Hitherto vitamin D has been obtained from irradiation of cholesterol and ergosterol of animals, particularly fish. Dr. Bills said today that there are now eight forms of vitamin D. Some are more active rickets-preventives in human children, while others are more effective for chickens.

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ENTOMOLOGY

Chinchbug and Hessian Fly Menacing, Hoppers Fewer

CHINCHBUGS, which have hung like a menacing cloud over the American grain belt ever since the drought began, continue their threat as spring small-grain crops rise well above ground and corn planting is completed.

Reports received by the U. S. Department of Agriculture show that the insects overwintered in large numbers in Illinois, Iowa, Missouri and eastern Kansas, and to a lesser extent in Ohio and Indiana. They are now migrating from their winter quarters in fieldside grasses to the growing spring grain.

Whether they will become a major scourge this year will depend partly on the weather from now on. Chinchbugs are favored by warm, dry weather, and suffer defeat when chill rains come.

Hessian fly is also a menace through a wide zone across the southern part of the great central grain belt, from Ohio to eastern Kansas. Grasshoppers, on the other hand, are for the present a pest collapsed. Only in a limited area in Montana is the infestation severe, though local campaigns are being conducted against them in Montana and North Dakota, and to a less extent in Minnesota.

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MIRRORS INVISIBLE LIGHT

Dr. Hammond Vinton Hayes, veteran Boston electrical engineer, adjusts his new type of radiation receiver which is more sensitive than photoelectric cells, or the best vacuum thermocouples, for invisible infra-red rays. The device makes possible signaling with invisible light. The rays are caught by the concave mirror at the left above and focused on the small cylindrical receiver. Electricity from the receiver runs through a shielded cable to an amplifying set where finally the signal is read with the microammeter on which Dr. Hayes' hand rests.

PHYSICS

Develops Ray Receiver for Signaling With Invisible Rays

A RUGGED, simple signaling device with which a mere Army private could communicate on invisible rays, a possible mechanism for detecting the presence of enemy ships off a fog-bound coast and a highly sensitive apparatus for use in atomic research are among the potentialities of a new receiver of radiation invented by Dr. Hammond Vinton Hayes, veteran electrical scientist of Boston, who was formerly chief engineer of the American Telephone and Telegraph Company.

Dr. Hayes, made cautious by a lifetime of experimental research, makes none of these claims for his new invention with the exception of the possibility of the signaling. But the implications of the discovery are clear.

Where many scientists nowadays ever seek the new to make research advances, Dr. Hayes goes back to a phenomenon first noted by the inventor of the telephone, Prof. Alexander Graham Bell. Before the meeting of the American Association for the Advancement of Science in 1880, Prof. Bell told how incident radiation sets up compression waves in the air.

Using this fifty-six-year-old knowledge, Dr. Hayes has built a receiver of invisible heat rays which appears to be much more sensitive than highly delicate thermocouples. It can be used by almost anyone, as contrasted with the specialized technique required to perform experiments with thermocouples.

Dr. Hayes' receiver looks like an oversized tomato can in its physical appearance. The receiver's opening is placed at the focus of a concave mirror which collects the radiation energy and reflects it on the receiver. From the back end of the receiver runs a snake-like, electrically shielded cable connected to a radio-type amplifier. The amplified current can be read on a milliammeter.

The rugged receiver operates by having the incident radiation produce compression waves in air within the apparatus. These waves move a thin disk which is part of the electrical circuit. The disk movement changes the electrical capacity of the circuit and thus varies the amount of current flowing in it. After amplification this minute change of current actuates the measuring meter.

Facing the ray-gathering mirror is the window end of the receiver, made of rock salt or other material capable of transmitting infra-red rays. The radiation, passing through this window, enters a small chamber containing a carbonized material which Dr. Hayes—for want of a better term—calls "fluff." Fluff is made by treating a pappus of a flower so that it yields a light, porous black substance that resembles soot.

Liberates Gas

Trapped by this porous material, the rays cause the fluff to liberate gas and set up compressional waves in the chamber. The waves move a thin aluminum diaphragm which is part of a standard telephone receiver. And the diaphragm's slight movement varies the capacity of the circuit as already mentioned.

Reporting his invention in the physicists' technical magazine, *Review of Scientific Instruments,* (May) the Boston scientist declares:

"The receiver is more sensitive than a photoelectric cell for waves of radiation longer than the visible (region of the spectrum) and is not affected by background light or heat, except when the background change is rapid. Moreover, it is insensitive to background noise."

For wartime signaling, it can be realized, such freedom from intense sounds in the background is a highly desirable attribute.

For use in signaling the method might well be to set up a source of invisible heat rays such as an electric heater which need not even be glowing at its ordinary cherry red temperature. Rays from this source would be focused by a concave mirror and transmitted as a narrow beam to the receiving equipment.

Interrupt for Code

Interruption of this invisible beam with the hand or a metal shield could be used to send messages in code. Movements in the recording electrical meter follow the on-and-off shutter motions.

"It is of interest to note," concludes Dr. Hayes in his report of the invention, "that the new receiver responds effectively when a body colder than the ambient temperature is substituted for the radiation source."

This might be construed to mean that one could do the signaling with a piece of ice, if necessary, (*Turn to page* 352)

VOLCANOLOGY

124 Earth Tremors In 10 Days at Mt. Lassen

See Front Cover

MOUNT LASSEN, America's one "live" volcano, continues to show signs of activity, word received by the U. S. National Park Service indicates. During the first ten days after the new steam jets began to spurt from its slopes, 124 distinct earth tremors were felt, and recorded themselves on the seismographs maintained at headquarters in Mount Lassen National Park.

The view of Mount Lassen which appears on the front cover of this week's SCIENCE NEWS LETTER was taken for the National Park Service by B. F. Loomis.

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PUBLIC HEALTH

Negro's TB Death Rate Due to Living Conditions

LIVING conditions rather than racial susceptibility may be responsible for the high tuberculosis death rate among American Negroes, it appears from a study of Bush Negroes living in the South American jungle. The study was reported by Prof. Morton C. Kahn of Cornell University Medical College to the National Tuberculosis Association.

The average death rate for Negroes in the United States is three to four times the average for the white population, Dr. Esmond R. Long, director of the Henry Phipps Institute, University of Pennsylvania, stated in another report at the same meeting.

Dr. Kahn's report was based on observations he made in an expedition to the Tapanahoni River region of Dutch Guiana, South America. These Negroes are of identical blood with the North American Negroes. Their ancestors came from the same part of West Africa. These slave ancestors revolted from the Dutch and since 1760 have been living in the wildest and most inaccessible part of Dutch Guiana. They have reverted to the same customs and type of existence as had their forebears in the forests of West Africa. Before the revolt, however, the ancestors of many of them had intimate contact with white people who presumably suffered from tuberculosis to the same degree as white populations in Europe.

Tuberculin tests were made on 765 of these Bush Negroes by Dr. Kahn and his assistants. Only 18 were found tuberculin positive, that is, infected with tuberculosis germs. Of these 18 only two men had had any contact with white people. One of them had made a brief visit to a trading post. The other had lived at the trading post for two years. This man was found suffering from active tuberculosis.

"It is evident that this man may be responsible for the spread of the infection in his village," Dr. Kahn stated.

Their isolation may be one reason why the Bush Negroes show so little evidence of tuberculous infection in contrast to their North American blood brothers and also to those Negroes living in the West Indies and the towns of Dutch Guiana.

Dr. Kahn believes, however, that another reason is the way the Bush Negroes live. Their towns are "universally clean and sanitary." Their huts are large and spacious, with no crowding, and usually open at both ends, thus insuring ample ventilation. They bathe frequently, eat a fairly adequate diet, and get plenty of sunlight. Even more important, it appears, is the fact that when they are tired they stop working.

Science News Letter, May 30, 1936

CHEMISTRY

Paints Get Sunburn, Too; Chemists Work to Combat It

PAINTS have a trouble corresponding to that afflicting the human skin in sunburn, it was disclosed at the meeting of the American Chemical Society.

Ultraviolet light from the sun, causing either a pleasant suntan or a painful burn depending on how much and how hurriedly a person acquires a daily dose, also affects paints. Especially does ultraviolet light cause the fading in white and light-colored paints.

Henry A. Gardner of the Institute of Paint and Varnish Research, Washington, D. C., told the chemists how various metals are now being combined in paint, with the chemical known as phthalic acid, to cut down the penetration of the ultraviolet and stop the troubles of paint chemists.

The use of the acid-metal combination known technically as "metallates" should substantially increase the life of external paints. Another valuable application, suggested Mr. Gardner, will be in rubber manufacture, since the same ultraviolet light of the sun is a contributing factor in the deterioration of rubber with time. Anything which can in some way reduce the penetration of the ultraviolet into the rubber will make longer lasting tires, as only one example.

Science News Letter, May 30, 1936

IN SCIE

SEISMOLOGY

Earthquakes Belong to Two Different Families

EARTHQUAKES are not all alike. There are two distinct families of them—born of wholly different geological parentage and under quite different circumstances, Dr. H. Landsberg of Pennsylvania State College declared in an address before the American Geophysical Union.

One family of earthquakes originate in regions where changes in the crust of the earth have for a long time been going on very, very slowly, and mainly in a slight up-and-down direction. Here the great blocks of the earth's deeper structure are pretty well consolidated: the "family background" of this group of earthquakes is solid and stable. The earthquakes are what might be expected of such a "conservative" origin; they cause only minor disruptions and disturbances. They arise mainly from the breaking of rock masses, or from slipping along the lines of breaks made in the past.

The other family of earthquakes have a more revolutionary background, and are of a more fundamentally violent type. They arise in regions where the deep strata of rock are in travail, bringing mountain ranges to birth. Here the crustal movements involve horizontal thrusts and pushings, and the earthquakes often originate far beneath the surface and produce catastrophic effects on the face of the earth.

Science News Letter, May 30, 1936

ENTOMOLOGY

Seven Ages of a Butterfly Studied By Scientist

SEVEN ages of a butterfly, no less marked than Shakespeare's seven ages of man, have been studied by Austin H. Clark of the U. S. National Museum on one little-known species, the golden-banded skipper.

During its "infancy" as a caterpillar, this insect changes its skin five times in about five weeks. Then it "pupates" as a violet-tinged white chrysalis. Finally, as the seventh stage in its life, it emerges as a full-grown butterfly.

Science News Letter, May 30, 1936

IEE FIELDS

PALEONTOLOGY

Termites Descended From Cockroaches, Fossils Show

WINGS of fossil cockroaches from Kansas, and wings of primitive termites found in Australia today, have shown an ancestral connection between the two groups of insects. The study was conducted by Dr. R. J. Tillyard, leading Australian entomologist. (*Nature*, April 18.)

That termites were descended from cockroaches has been conjectured for a long time, but conclusive evidence was lacking. Dr. Tillyard found that the shape, vein-patterns, and especially the mode of folding the wings were almost identical between the modern Australian termite and the Kansas roach of more than 200 million years ago.

Science News Letter, May 30, 1936

ANTHROPOLOGY

What Is an American? A Mixture of Races

WHAT is an American?

Not a "pure Nordic," typically, said Prof. E. A. Hooton, of Harvard University, answering his own question before the New Haven meeting of the American Association of Physical Anthropologists. Of three good-sized samples of the American population, taken from diverse social and geographic backgrounds, the pure Nordic type averages out by long odds the least numerous —only 2.25 per cent. of the total.

The largest groups, in the nine physical types into which Prof. Hooton analyzed the American population, are Nordic mixed with something else—Nordic-Mediterranean and Nordic-Alpine. The first of these two types have long heads and darkish coloration; the second have round heads and medium coloration—never either pure blonds or pure brunettes. Other physical types added by the Harvard anthropologist to the Nordic-Alpine-Mediterranean racial triad of popular conversation and writing are the Dinaric, a round-headed, medium-colored, narrow-nosed people, mostly Teutonic in modern distribution, and the East Baltic, also round-headed, but blond and wide-nosed. He also recognized as a definite physical racial type the long-headed, red-haired, blue- or gray-eyed Keltics.

Prof. Hooton took his population samples in three different ways: from a considerable number of prisons, from "ordinary citizen" groups in Boston and Nashville, and from a group of rather highly educated persons who visited the Century of Progress in Chicago. Especially interesting, in his estimation, is the fact that the racial percentage in each group, whether jailbird, man-in-the-street, or high-brow, was just about the same as the percentage in the whole population. That is, a really scientific analysis cannot discern any such thing as racial criminality or racial superiority.

This does not mean that there is no correlation between racial type and tendencies in activities, whether criminal or lawful. Thus, criminal Keltics tend to sex offenses and to crimes involving violence, while criminal Nordics are "experts," specializing in forgery and fraud, but not going in very much for murder. Yet unjailed Keltics rate very high in education, while Nordics at large show a more moderate achievement in this direction.

In concluding his discussion, Prof. Hooton poured scorn on "the ridiculous and pernicious doctrines of racial inequality which have become a menace to the peace of the world." There is no anthropological ground whatsoever, he said, for selecting any so-called racial group, or any ethnic or national group, or any linguistic or religious group for preferment or for condemnation.

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ZOOLOGY

Quintuplet Lion Cubs Are Born in Denmark

THE city of Odense, famed chiefly as the birthplace of Hans Christian Andersen, Denmark's great story-teller, can now lay new claim to fame for another birth. This time it is quintuplet lion cubs, born to a lioness in the municipal zoological park.

The mother was unable to nurse all of her offspring at once, so a canine wet-nurse was called into service. She took over two of the cubs, in addition to her own puppies. The arrangement proved to be satisfactory to all concerned.

Lions in captivity ordinarily do not give birth to more than two or three cubs at one time, and the arrival of more than four is considered most unusual by zoo officials.

Science News Letter, May 30, 1936

PHYSICS

$10,000 Violin Really Better Than Cheap Fiddle

IS a ten-thousand-dollar violin technically superior to a twenty-dollar fiddle?

This question propounded some time ago to Prof. Frederick A. Saunders, physicist of Harvard University, might be restated: Putting aside sentiment, is a costly violin, bearing a famous Italian name, better from the acoustic standpoint than an ordinary instrument of modern manufacture?

In an address at the University of California, Dr. Saunders described the experiments which led to an affirmative answer. Violin manufacturers, to be sure, could have given the distinguished physicist the same answer without waiting for experiment, but unfortunately their methods of appraisal are those of the artist and artisan, not of the scientist. A violin of superlative quality from such sources is thus not subject to exact reproduction or low cost of production.

In the Harvard tests of good and bad fiddles advantage was taken of vacuum-tube testing instruments which have revolutionized acoustics in recent years. Every wooden strip, post or partition in the violin was subjected to the searching ear of the electrical equipment.

Results so far indicate that the back and sides of a violin have no important relation to emission of good tone, although faulty parts of such type may emit undesired sounds in addition to the possible good tone of other sections of the instrument. Ornamentation of these under parts, including carving, often practiced in earlier centuries, is thus tolerable. The top of the instrument is of vital importance, however. It emits far more sound than the strings.

The principal merit of tone quality in the high-class violins was found to lie in the lack of superfluous overtones. These undesired tones were found to come from various odd parts of the woody framework of the cheaper fiddles.

The substitution of light metal for part or all of the wood of the violin has been considered by Dr. Saunders and others. So far, however, no convincing demonstration has been made that a metal frame can be constructed as light as the wood, but strong enough to withstand the tightening of strings. Only from a very light frame can the desired volume of pleasing tone be secured. Even aluminum appears to be too heavy.

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ASTRONOMY

June Brings Eclipse

Magnificent Spectacle Will Take Astronomers To Siberia; At Home You May See Brilliant Jupiter

By JAMES STOKLEY

THE most important astronomical event in June that can be predicted is the total solar eclipse on June 19, but this will not be seen at all from the United States. Northwestern Canada and Alaska will see it, but only as a partial eclipse. At 10:50 p. m., Eastern Standard Time, on June 18, or 3:50 a. m. on the 19th, Central European Time, the tip of the moon's shadow will touch the earth in the Mediterranean Sea, south of Italy. Then it travels over Greece, including the city of Athens; Turkey; the Black Sea; the Crimea; Siberia, north of the Caspian Sea, through the cities of Omsk, Kainsk, Tomsk, Kansk, Bratsk and Khabarovsk; Japan, including the cities of Koito and Nemuro; and then out in the Pacific Ocean, where it leaves the earth at 1:50 a. m., Eastern Standard Time, at which point the sun will then be setting. (*See SNL*, April 11, for map.)

Near the Siberian city of Bratsk, the shadow will pass at local noon, so there the sun will be highest and the eclipse seen to best advantage. Here the shadow will take 2 minutes and 32 seconds to go past, and during that period the sun will be completely covered by the moon; in other words, the eclipse will be total. At Athens, the sun will have just risen when the total eclipse occurs, and it will last a much shorter time. Furthermore, the sun being so low in the sky, observations may be hampered by early morning clouds. At Krasnodar, on the northern shore of the Black Sea, the total phase will last about a minute and a half. In northern Japan, the duration will be about 2 minutes and the sun will be high enough to make good observations possible, provided weather permits.

Weather a Gamble

After all, it is weather that makes any eclipse expedition a gamble. And while weather statistics for various places over periods of many years may indicate the probability of a clear sky at the crucial moment, they do not permit a definite prediction. Consequently, the astronomers have very wisely scattered themselves, with the idea that if one expedition is hampered by clouds, others will have better luck.

The wisdom of a similar policy was shown at the last eclipse seen in the United States, that of August 31, 1932. Then the shadow of the moon crossed Canada and New England. Past weather records indicated that there was a little better chance for good weather inland than near the coast, but the afternoon turned out otherwise. With the parties so scattered from the Maine coast to the province of Quebec, about half of them were successful, and a good series of observations was obtained.

U. S. Sends 2 Parties

Two American universities have sent expeditions to Siberia, one from Harvard, the other from Georgetown, the latter in collaboration with the National Geographic Society. Many other groups, from English, German, Russian and Japanese observatories, will also be ready to make the important observations possible only when the moon comes completely in front of the sun.

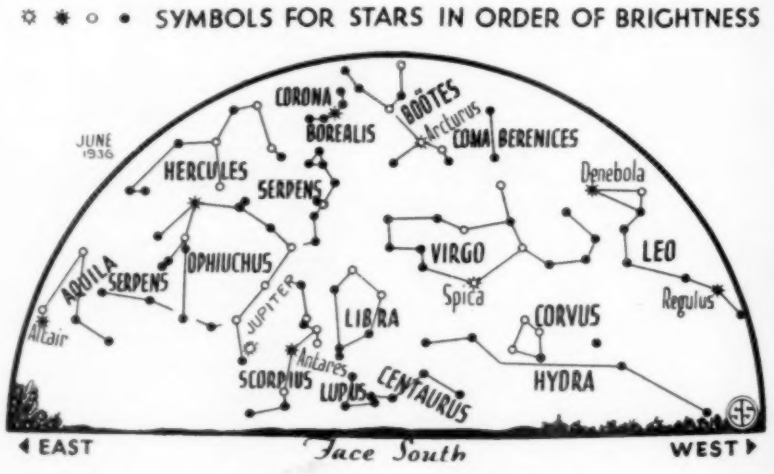
These chiefly concern the corona, the sun's outermost layer. Although present at all times, the corona is only about a half-millionth as bright as the sun's disk, and is ordinarily hidden by the overpowering glare. But when this is cut off, the corona shines with a pearly glow around the black disk of the moon.

In the last few years, experiments have been made to record the corona without an eclipse, but while these may eventually be successful, they have not been perfected sufficiently so far to make the eclipse observations unnecessary.

Every Year and Half

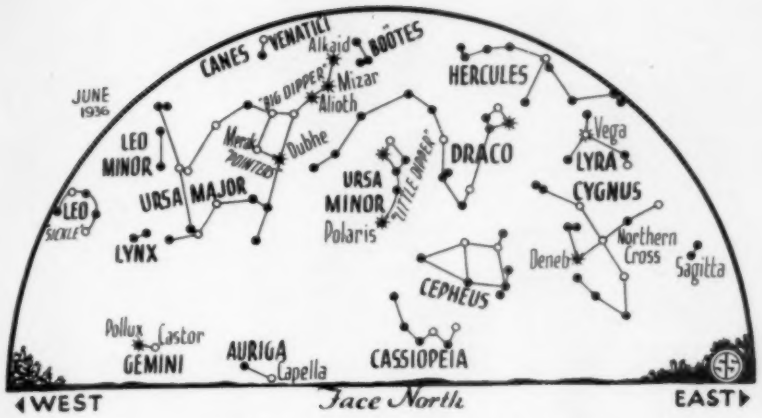
About every year and a half, there is a total eclipse visible from some part of the earth, and not all of these are suitable for observation. An eclipse can last more than 7 minutes, but one of even 5 minutes is rare, and 2 or 3 minutes is more common. Therefore, if an astronomer were to observe all the eclipses possible during his lifetime, he would see the corona for possibly half an hour. This makes it essential to take advantage of every opportunity. New, extremely sensitive photographic plates will be used at this eclipse to record faint details of the corona, while others will record it in full color.

There are many other observations that are made by eclipse expeditions. Many of these are with the spectroscope, which analyzes the sun's light. Just at the moment the moon's disk fully covers the sun, the latter's atmosphere



BRIGHTER THAN ANY STAR

The planet Jupiter is easily located in the southeast. On June 15 it will be only 397,981,000 miles away, shining with a splendor exceeded only by Venus, the moon and the sun.



HANDLE UP AND HANDLE DOWN

Hanging "right side up" is the familiar Great Dipper. The other side up is the Little Dipper with important pole star, Polaris, marking the end of the handle.

shines for an instant unmixed with the light from the disk. Ordinarily the sun's spectrum consists of a band of colors, crossed by numerous dark lines, but the "flash spectrum," which appears at such a moment, is made up only of bright lines. Its study gives astronomers much information about the distribution of the gases in the solar atmosphere. The Harvard University expedition will be mainly concerned with such researches.

Measures of the transmission of radio waves through the moon's shadow, of the temperature changes, of the radiation of the eclipsed sun are also often made by such parties.

Magnificent Sight

Quite aside from its scientific importance, however, an eclipse of the sun is truly a magnificent spectacle, and this will be most impressive to the thousands of spectators, Russian, Japanese and foreign, who will undoubtedly line the path of totality. They will see the moon gradually cover the sun. Just as the eclipse is about to become total, the Baily's beads will appear, a series of points of light caused by the light from the sun's edge shining through valleys on the moon. Then the corona will flash out, and possibly a few prominences will be seen, flame-like clouds of hydrogen that rise sometimes to hundreds of thousands of miles above the solar surface. If the prominences appear, they will be the brightest objects visible. Venus, Mercury and Mars will be seen, all to the west of the sun. With totality over, the Baily's beads reappear, but on the opposite edge of the moon, the corona and prominences disappear, and a narrow crescent of the sun's disk comes into view, which enlarges until the entire sun is shining again.

The moon this month will be new on the 19th, since an eclipse of the sun must always occur when the moon is at this phase. Full moon will come on the 5th, last quarter on the 12th and first quarter on the 26th. This means moonlit evenings during the first and last weeks of June. The moon will be closest the earth on June 15, at a distance of 227,650 miles, while it will be at its greatest distance on the 27th, 251,200 miles away.

Still another interesting event will come on Sunday, June 21, at 9:22 a. m., Eastern Standard Time. Then the sun will be at its farthest north in the sky, and at this moment summer will start.

With Sirius gone from the evening sky, Vega is now the brightest star to be seen. It marks the constellation of Lyra, and appears in the east at the times for which the accompanying maps are drawn (10:00 p. m., standard time, on June 1, 9:00 p. m. on the 15th, and 8:00 p. m.—before it is dark—on the 30th). Just below Vega is part of Cygnus, the swan, otherwise known as the northern cross. The cross now rests on one side, the top, the star Deneb to the north. A little lower, and directly east, is Aquila, the eagle, with Altair.

Brightest Object

Most brilliant of the objects seen in the evening during June is the planet Jupiter, to the southeast, where its great brilliance leaves no doubt as to its identity. This month it is of the minus 2.2 magnitude, brighter than any star, and is only 397,981,000 miles away on the 15th. Only Venus, the moon and the sun exceed its splendor. To the right of Jupiter is the constellation of Scorpius, the scorpion. The heart is marked by the red star Antares. Higher, and farther to the right, is Virgo, the virgin, with Spica; above this is Boötes, with Arcturus.

Hanging handle upwards northwest of the zenith, is the Great Dipper, most familiar part of Ursa Major, the great bear. The pointers, the two stars at the bowl farthest from the handle, indicate the direction of Polaris, the pole star, directly north. Polaris is at the end of the little dipper's handle, which is pointed downward.

To the west is the constellation of Leo, the lion, the lower part of which is called the sickle, because of its shape. The first magnitude star Regulus is at the end of the handle. Low in the northwest there are two bright stars, Castor and Pollux, all that now remains visible of Gemini, the twins, while still farther north is Capella, in Auriga, the charioteer, another conspicuous group during winter evenings, but now scarcely visible.

During June, Mars and Venus are so close to the sun that they cannot be seen either in the morning or the evening. About four hours before sunrise, however, Saturn appears in the east as a "morning star." About June 25, Mercury, then at its greatest distance west of the sun, will join it as a herald of the new day, but it will not come up until dawn has already begun.

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ANTHROPOLOGY

To Hunt Oldest Americans At Doorstep of Continent

A HUNT for the most ancient human beings in America will be conducted this summer, by an expedition to the northwestern doorstep of the continent, where the first immigrants presumably entered.

Led by Henry B. Collins, Jr., of the Smithsonian Institution, the expedition sponsored jointly by the National Geographic Society and the Smithsonian is en route to the westernmost point of North America, Cape Prince of Wales, Alaska. This is the most likely place where ancient men would have crossed from Asia, only 55 miles away via Bering Strait.

Previous Alaskan expeditions by Mr. Collins and other archaeologists have pushed Eskimo pre-history back to about 1000 B.C. The expedition has hope of finding skeletal remains or discarded weapons of still earlier people who must have passed this "port of entry" region at the dawn of American habitation.

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but such use would be more novel than of practical significance.

The great sensitivity of the new receiver led Dr. William M. Hall of Massachusetts Institute of Technology to develop electrical circuits with which the equipment might be used for exact, quantitative studies of radiation energy in research problems.

As an accompanying paper in the *Review of Scientific Instruments*, Dr. Hall reports his findings on experiments to test the sensitivity of the device as compared with other standard type of infrared receivers.

Dr. Hall tested the sensitivity of the device and obtained values measured in volts of electrical potential per watts of incident energy falling on a given unit area (one square centimeter) of receiver.

If that sounds technical, do not worry too much about the exact way of expressing sensitivity. Scientists have to have some numerical values in order to compare different instruments built to do the same thing. And these comparison numbers have to be specified in predetermined and agreed-upon units. That is where the volts per watt per square centimeter come in.

Important are the figures themselves. The theoretical maximum sensitivity is .70 for a thermocouple with tellurium-bismuth junctions operating in a vacuum. By comparison the sensitivity of the new Hayes' receiver is 126. Thus, the Hayes' instrument is 180 times as sensitive as the best vacuum thermocouple and 900 times as sensitive as some other types such as the constantan-manganin junction couples.

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PSYCHIATRY

Political Control of Mental Disease Hospitals Denounced

A GRUESOME but appropriate punishment for politicians who seek to control hospitals for mental disease was suggested by Dr. Clarence O. Cheney of New York City at the meeting of the American Psychiatric Association in St. Louis. In his address as retiring president of the Association, Dr. Cheney denounced political control of such institutions in the following vigorous words:

"I have been able to imagine no more demoralizing influence to psychiatric hospitals than to have appointments made or persons removed from service because of politics.

"We do not wish to seem too harsh but at the same time we say with a strong conviction that if there is no other way for politicians to keep politics out of psychiatric hospitals, then we can only wish for them that they or their own families, visited by mental illness, would be placed in charge of those untrained, uninformed persons who have come to such a position of authority through political means. Then perhaps they would see the light and know that decent care of the mentally ill who have no votes and cannot speak for themselves is one of the prime functions of government, requiring experience and training no less than decency in those responsible for that care and that whoever has no realization of such principles is unfit to represent even the lowliest in the community."

Encouraging is Dr. Cheney's suggestion that the future will see a decrease in the ever-increasing burden of state budgets for the care of mental patients.

The decrease foreseen by Dr. Cheney may come as a result of the increasing tendency to care for the mentally sick in their homes under the supervision of private physicians, clinics and public health nursing and social service. Dr. Cheney also believes that in the future more of these patients will be cared for in general hospitals. All of this will tend to reduce the number of patients to be cared for in the state-supported hospitals for mental disease.

The increase in population of these hospitals does not mean, in Dr. Cheney's opinion, an increase in the number of persons suffering from mental disease. Instead he attributes it to an increasing familiarity with mental hospital care and its possibilities, changes in economic conditions and increase of urban over rural populations.

The idea that the stress and strain of modern living has increased the amount of mental disease was contradicted by Dr. Cheney, who pointed out that there are no actual facts to support this assumption, which was brought forward as early as 1734.

Science News Letter, May 30, 1936

NAVIGATION

New Type of Sextant Is Suitable for Use in Air

ONLY in the last few years has aviation reached the stage where the pilot could do more than devote his entire efforts to the problem of takeoff and keeping his plane in the air.

With increased mechanical perfection and all manner of automatic apparatus to take over increasing duties of flight, the present era of aviation is marked by increasing attention to duties comparable with those of a captain on a ship at sea. Particularly has navigation—the problem of telling where the plane is over the surface of the earth—become a major job for the pilot. Moreover, navigation is an aviation problem which it seems doubtful will ever be taken over by automaton devices.

As pilots attempted navigation with the mariner's usual device—the sextant—it became immediately clear that the method, while correct, was too slow and cumbersome. Seagoing "water cooled" methods of navigation had to be replaced with speedier "air-cooled" techniques. Typical of changes made necessary is the new equipment in which a small bubble of fluid takes the place of the whole ocean. The new apparatus has been built from plans submitted by the Bureau of Aeronautics and Lieut. Commander P. V. H. Weems.

The new equipment, now used by the Government, is known as the Aircraft Bubble Sextant and is designed for "shooting" the stars and the sun when no horizon is visible.

Bubble for Horizon

A tiny bubble, inside the compact instrument, takes the place of the sea horizon. From simultaneous readings on the artificial bubble horizon and the position of the heavenly body, quick calculation deducts the position of the aircraft even though the whole surface of the earth may be hidden beneath clouds.

While designed primarily for aircraft, the apparatus, produced by Bausch and Lomb, is equally useful for surface vessels during the long period between evening and morning twilight when the stars are visible but there is no horizon, or on occasions when the sun can be seen through rifts in the clouds but there is no horizon from which to measure the angle of the sun's elevation.

To "shoot" the sun or stars with the new instrument, the observer looks through the eyepiece. There he sees the

FOR NAVIGATION ALOFT

A new navigation instrument suitable for the aerial voyager is the bubble sextant held by Lt. Com. P. V. H. Weems, of the U. S. Navy. Examining it are George W. Gallasch, of the Bausch and Lomb scientific bureau (left) and Carl L. Bausch, director of research and engineering for that company.

internal bubble as a sharply defined circle to the center of which the heavenly body is brought to coincidence.

For use at night the bubble is illuminated by the light of a small flashlight bulb whose battery is carried inside the handle of the instrument. Filter glasses, to cut down the brilliance of the sun or moon where necessary, can be quickly swung into place on the equipment by the turn of a knob.

Such well-known aviators as Lindbergh, Gatty, Ellsworth and Goebbel have tested the new sextant in aerial flight.

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PHYSIOLOGY

Study of Thyroid Gives New Idea of Gland Mechanisms

NEW experiments on the mechanism by which glands of internal secretion send their powerful chemicals through the body have been reported by Prof. J. F. McClendon of the University of Minnesota to *Science*. Prof. McClendon's studies, which confirm Uhlenhuth's theory, may solve one of the outstanding puzzles of medical science. He has made a 15-year study of the thyroid gland.

In the course of the experiments Prof. McClendon whirled bits of thyroid gland in a centrifuge so that the force acting on the cells was sometimes equivalent to 200,000 times gravity.

The thyroid and other glands of internal secretion control and regulate growth, development, sex and other body processes by means of powerful chemicals which they produce. Unlike other glands, however, the glands of internal secretion have no apparent ducts or passages from the body of the glands to the rest of the body. They are called ductless glands for that reason. Prof. McClendon's latest study of the thyroid suggests how these ductless glands send their secretions into the body.

The process, in the thyroid gland at any rate, seems to depend on the fact that the cells of the gland which produce the important chemical are loosely held together, so that the chemical itself can escape by finding passages between the cells and thus eventually make its way out to the rest of the body. To understand this mechanism, Prof. McClendon has discovered, it is necessary to have in mind a picture of thyroid gland architecture.

A slice of the gland looked at under the microscope is seen to consist of many little sacs lined with secreting cells and filled with a jelly-like material called colloid. The reserve supply of the thyroid secretion or hormone is dissolved and stored in this colloid. The entire gland is enclosed in a capsule of connective tissue in which there are lymph spaces and blood vessels. Once the hormone-containing colloid escapes from the cells into this connective tissue, the blood and lymph streams may carry it through the body.

The problem of how the colloid with its supply of hormone gets into the connective tissue is what Prof. McClendon investigated. He placed thyroid gland tissue of animals in a special centrifuge and subjected it to a centrifugal force 10,000 times gravity. This force is not sufficient to make the colloid material pass through the connective tissue capsule at any appreciable rate. It is sufficient, however, to make a number of cells of the thyroid's secreting sacs break loose and fall through the colloid, leaving a hole for the colloid to escape through into the connective tissue with its blood and lymph vessels. Prof. McClendon was able to observe the passage of the colloid through such holes.

The cells themselves are not injured by a centrifugal force 200,000 times gravity although they are separated by much lesser centrifugal force. This indicates, Prof. McClendon says, that the cells are held together relatively loosely, and that the hormone-containing colloid can probably pass out between the cells, although it could not pass through the cell walls.

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THE IDENTITY THEORY
By Blamey Stevens

Propagations

All phenomena of the ether are due to propagations, and these in turn depend on a differential equation that expresses the identity of space and time. The detailed nature and path of the propagated entity is determined by the initial conditions. These are only required upon integration of the differential equation, and are therefore unnecessary to the expression of the fundamental postulate of space-time identity.

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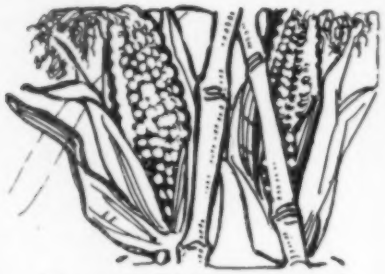
HISTORY OF SCIENCE

NATURE RAMBLINGS
by Frank Thone



Botany: Oldest Science

BOTANY is the oldest of the sciences, and not astronomy as is frequently claimed. This thesis was defended in an address before a Washington audience of scientists, by Dr. Elmer D. Merrill of Harvard University.

Astronomy, Dr. Merrill admitted, might be able to make good its claim within a more limited field: it is perhaps the oldest of the exact sciences. But long before the traditional Chaldean shepherds watched the stars while their flocks slept,

". . . . and tamed them
With grave, mysterious, and lovely words,"

the men of the Old Stone Age perforce had to know the plants in the woods they inhabited: which were good for food, which for medicine, and which would kill you if you ate them. Elementary and utilitarian as this knowledge was, it still was botany, Dr. Merrill pointed out; and from it eventually grew botany's daughter science, agriculture.

Agriculture, which is the basis of the settled life that is civilization, probably began more or less by accident, Dr. Merrill believes. In certain places where the wild ancestors of our present-day food plants, especially the grains, grew best, the nomadic tribes stayed longer, and by degrees came to scatter some of the seed, and then to till the soil more deliberately.

These birthplaces of agriculture were not in the places usually assigned to them, he contended. They were not in the great river valleys, neither were they in the tropics. Egypt and Mesopotamia, traditional birthplaces of agriculture, received their grains and the knowledge of cultivation from elsewhere. They gained their credit not by inventing agriculture, but by inventing writing and making their knowledge a matter of record.

That these old observers and early cultivators of plants did their work well is attested by the fact that every important food plant in the world has come down to us from prehistoric times. We moderns have improved and refined, but we have made no new domestications worth mentioning. The ancients chose critically, too: there are hundreds of thousands of species of wild plants, yet the total list of important plant food sources, ancient and modern, does not add up to many more than a hundred species.

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ARCHAEOLOGY

Incantations of Babylonia Of Long Ago Read

BELIEF in magic by incantation was widespread during the middle of the first Christian millennium, judging from "magic bowls" that have survived to this day.

Dr. Julian J. Obermann, Professor of Semitic Languages at Yale University, discussed before the American Oriental Society, meeting in New Haven, the incantations that he has deciphered.

The "magic bowls" in the Yale Babylonian Collection were found at the site of Nippur and are terra-cotta jar-like vessels varying in size and workmanship. The inside surfaces are inscribed with incantations.

Regardless of difference in script, dialect and religious affiliation, the inscriptions followed a well-defined, stereotyped formula.

"As a rule," Dr. Obermann said, "they begin by stating the prophylactory purpose of the incantation, and the person or persons for whom they are intended; they continue by enumerating the dangers of black magic against which they offer protection; and they wind up with imprecations against the spirits of evil, and a religious eulogy of a more general character. Nevertheless, each of the incantations betrays a literary and cultural physiognomy peculiarly its own."

Three Types

His work in deciphering the incantations has led Dr. Obermann to classify them according to three different types of Aramaic script—Syriac, Mandaic and Judeo-Aramaic—and in at least as many dialects of Aramaic speech. Aramaic was the most widely spoken and written Semitic language for about a thousand years prior to the rise of Islam, and it also prevailed in pre-Mohammedan Iraq.

One bowl in the Yale collection is inscribed with a lengthy Mandaic text. The author appears to wage war against the Princess of Darkness. Yet this incantation, Dr. Obermann said, opens with the solemn Gnostic words: "In the name of the great strange Life, from the worlds of exceeding Light, which transcends all creatures." Another specimen of peculiar interest is Judeo-Aramaic in script and style.

Brief and Sober

"Its inscription is as remarkable for its brevity, concision, and sobriety as the Mandaic bowl is for its complexity, profusion, and solemnity," Dr. Obermann said. "It is written for the benefit of one Farruch Chusrau, his three wives and his seven children, all mentioned by their names which, with but one doubtful exception, appear to be Iranian in character. If this family was, to judge by the names borne by its members, of Persian stock, or at any rate, of Persian civilization, they must be assumed to have been of Aramaic tongue, or they would hardly have ordered for their magic protection an Aramaic amulet. By religion they may have been Jews, Christians, Mandaites, or some of the other faiths extant in pre-Mohammedan Iraq. The author of the incantation, however, betrays his Hebrew background by using for 'amulet' a technical term found only in Rabbinic literature, and by writing once a common Semitic phrase in peculiarly Hebrew orthography."

This brief inscription, Dr. Obermann said, illustrates importance of the incantation bowls, as authentic witnesses to the spelling and writing of East-Aramaic, but also for the culture and religion of Sassanid Iraq, of which, outside the magic inscriptions, first-hand contemporary documents are strikingly scarce.

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•First Glances at New Books

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Psychology

COMPARATIVE PSYCHOLOGY, VERTEBRATES—Carl J. Warden, Thomas N. Jenkins, and Lucien H. Warner—*Ronald Press,* 560 p., $4.50. The second volume of a comprehensive treatise containing a great wealth of material on the psychology of the vertebrates from fish to ape. The psychologist will probably regard this work as a necessity for his bookshelves and the biologist will also find interest in it. Aside from its technical value, the interesting facts it records make it good reading. Did you know, for example, that only a few snakes hiss? That the ratio of power to weight is higher for birds than for any other vertebrate? Or that calves are probably color-blind? A bibliography of 199 titles is included.

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Travel

MOTORISTS' GUIDE TO MEXICO—Michael and Virginia Scully—*Turner Co., Dallas, Texas,* 104 p., 35c.

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Mathematics

ANALYTIC GEOMETRY—C. H. Sisam—*Henry Holt,* 310 p., $2. A text by the professor of mathematics at Colorado College. It is primarily intended for a course of three semester hours, but includes subject matter for a five-hour course, arranged so as to facilitate use of as much material as is desired.

Science News Letter, May 30, 1936

Biology

SOCIAL BIOLOGY—Everett P. Walton and Philip E. Foss—*Blakiston's,* 572 p., $1.68. A general textbook for secondary schools, in which the conscious aim is to interpret biological phenomena in terms of social significances.

Science News Letter, May 30, 1936

Mathematics

AN OUTLINE OF PROBABILITY AND ITS USES—Maurice C. Holmes—*Edwards Bros.,* 119 p., lithoprinted, $1.50.

Science News Letter, May 30, 1936

Chemistry

EXPERIMENTS IN CHEMISTRY; 3rd Ed.—Howard B. Lewis and Lila Miller—*Edwards Bros.,* 67 p., $1.90.

Science News Letter, May 30, 1936

Botany

THE FORESTS AND FLORA OF BRITISH HONDURAS—Paul C. Standley and Samuel J. Record—*Field Museum of Natural History,* 432 p., $2.25. A taxonomic recording of the flora of a botanically interesting region hitherto much in need of such treatment; with brief discussion of geographic and economic botanical topics.

Science News Letter, May 30, 1936

Medicine

DON'T BELIEVE IT!—August A. Thomen—*Pub. by author,* 348 p., $2.65. "False notions, errors, misconceptions and misinformation pertaining to health and hygiene, major ailments and cancer, minor ailments and remedies, food and diet, mind and senses, body, marriage and death; and health fallacies derived from superstition and folk-lore, explained and corrected."

Science News Letter, May 30, 1936

Physics

PHOTO-ELECTRIC AND SELENIUM CELLS, THEIR OPERATION, CONSTRUCTION AND USES—T. J. Fielding—*Instruments Publishing Co.,* 140 p., $1.75. American edition of a book published in England by Chapman and Hall.

Science News Letter, May 30, 1936

Sports History

LITTLE WOMEN GROW BOLD—Mary E. Ford—*Bruce Humphries,* 242 p., $2. A history of sportswomen and adventurous women from ancient times to the present.

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Ichthyology

THE MARINE FISHES OF WEST AFRICA BASED ON THE COLLECTION OF THE AMERICAN MUSEUM CONGO EXPEDITION, 1909-1915—Henry W. Fowler—*American Museum of Natural History,* 605 p., $5. Monographic treatment, illustrated with line drawings, of the fish fauna of a little-known region.

Science News Letter, May 30, 1936

Biography—Medicine

THOSE WERE GOOD DAYS—Carl Ludwig Schleich (Trans. by Bernard Miall)—*Norton,* 280 p., $3.50. Reminiscences by a distinguished surgeon, who was the pioneer in local anesthesia as well as a brilliant musician, painter and poet.

Science News Letter, May 30, 1936

Sociology

CITY PLANNING HOUSING—Werner Hegemann—*Architectural Book,* 257 p., $3.75. This first volume of a three-volume set covers historical and sociological angles of housing, from George Washington's plans for a capital city to interesting modern projects in Sweden.

Science News Letter, May 30, 1936

Hygiene

PERSONAL AND COMMUNITY HYGIENE GUIDEBOOK—Howard L. Conrad and Joseph F. Meister—*Edwards Bros.,* 63 p., 60c.

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Physics

UNITS OF WEIGHT AND MEASURE (United States Customary and Metric); Definitions and Tables of Equivalents—National Bureau of Standards—*U. S. Govt. Print. Off.,* 68 p., 15c.

Science News Letter, May 30, 1936

•RADIO

June 2, 2:15 p. m., E.S.T.

WHAT ABOUT TWINS?—Dr. Alan Guttmacher of Johns Hopkins Medical School.

June 16, 2:15 p. m., E.S.T.

CRIME LABORATORIES—Dr. William Souder of the National Bureau of Standards.

(No program on June 9.)

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

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•First Glances at New Books

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Child Care

DR. DAFOE'S GUIDEBOOK FOR MOTHERS—Allan Roy Dafoe—*Messner*, 246 p., $1.50. Every mother will want this book because it is written by the man who has become probably the most famous "baby doctor" of our generation as a result of his successful care of the Dionne quintuplets. Every baby will benefit if his mother—and father—reads the book because it is full of sound advice on matters important to baby welfare. In addition, the informal, charming style reflects the author's personality so well that those who have not had the privilege of meeting Dr. Dafoe may make his acquaintance by reading this book.

Science News Letter, May 30, 1936

Economics—Engineering

REGIONAL PLANNING—Karl B. Lohmann—*Edwards Bros.*, 143 p., $4. A lithoprinted, paper-bound text prepared by the professor of landscape architecture at the University of Illinois. Regional planning "involves a knowledge of how the population is to be distributed for the realization of social and economic aims and how it is to be cared for in its housing, commercial, industrial, recreational and other facilities."

Science News Letter, May 30, 1936

Aviation

THIS FLYING GAME—H. H. Arnold and Ira Eaker—*Funk & Wagnalls*, 275 p., $3. Two U. S. army officers, authorities in their field, discuss the history of aviation, training and qualifications for flying and for other positions in aviation, airplanes and airships of today and probable future developments. It has an especial appeal for the fathers of the airminded youngsters who belong to one of the various junior flying clubs.

Science News Letter, May 30, 1936

Botany

FLORA OF PERU, Part I—J. Francis Macbride—*Field Museum of Natural History*, 320 p., $2. The first volume of what promises to be an important taxonomic series. This volume includes genera from *Zamia* to *Carex*.

Science News Letter, May 30, 1936

Psychology

LECTURES ON CONDITIONED REFLEXES—Ivan Petrovitch Pavlov; Trans. by W. Horsley Gantt and G. Volborth—*Liveright Pub. Corp.*, 414 p., $3. A new edition of this important work. The translator spent the years from 1925 to 1928 in Prof. Pavlov's laboratory as a co-worker during which time he gained the insight into the great Russian physiologist's accomplishments which facilitated his translation of these lectures. The book contains an introduction by Dr. Walter B. Cannon, and a biographical sketch of Prof. Pavlov.

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Biology

ANIMAL MICROLOGY — Michael F. Guyer—*Univ. of Chicago Press*, 331 p., $2.50. Fourth edition, revised.

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Mathematics

L'ARITHMÉTIQUE DANS LES ALGÈBRES DE MATRICES—Claude Chevalley—*Hermann & Cie., Paris*, 33 p., 10fr.

Science News Letter, May 30, 1936

Statistics

ÉTUDE STATISTIQUE DE LA FÉCONDITÉ MATRIMONIALE—A. C. Mukherji—*Hermann & Cie., Paris*, 78 p., 16fr.

Science News Letter, May 30, 1936

Mathematical Physics

LES DÉFINITIONS MODERNES DE LA DIMENSION—Georges Bouligand—*Hermann & Cie., Paris*, 44 p., 12fr.

Science News Letter, May 30, 1936

Mathematics

LES INVOLUTIONS CYCLIQUES APPARTENANT À UNE SURFACE ALGÉBRIQUE—Lucien Godeaux—*Hermann & Cie., Paris*, 43 p., 12fr.

Science News Letter, May 30, 1936

Mathematics

EXPOSÉS SUR LA THÉORIE DES FONCTIONS: 1, Les Théorèmes de la Moyenne pour les Polynomes—J. Favard, 50 p., 15fr.; 2, Séries Lacunaires—S. Mandelbrojt—*Hermann & Cie., Paris*, 40 p., 12fr.

Science News Letter, May 30, 1936

Hygiene

NEW BODIES FOR OLD—Dorothy Nye—*Funk & Wagnalls*, 135 p., $2. Almost any woman will feel inspired to try the exercises so clearly described and cleverly pictured; for, alas, How many of us have *perfect* figures?

Science News Letter, May 30, 1936

Psychology

THE ANATOMY OF PERSONALITY—Howard W. Haggard and Clements C. Fry—*Harper*, 357 p., $3. Physicians are coming to recognize that body and mind do not exist separately; when one is ill both must be considered in the treatment. To what extent one influences the other still remains a puzzling problem, however. The scientist takes little stock in the theories of those who would read character or personality from the bumps on the head or other external features. But many believe that there are constitutional factors which may determine alike the emotional make-up and the body build. The person of one body build, who is subject to certain groups of physical diseases seems likely, if he develops mental disease, to have it come in the form of certain of the psychoses and not of others. This book by the authors of "Devils, Drugs and Doctors" is a readable discussion of what medical science has contributed to this field.

Science News Letter, May 30, 1936

Aeronautics

PRACTICAL AIR NAVIGATION AND THE USE OF THE AERONAUTICAL CHARTS OF THE DEPARTMENT OF COMMERCE—Thoburn C. Lyon—*Govt. Print. Off.*, 62 p., 44 illus., 2 plates, 30c.

Science News Letter, May 30, 1936

Invention

INVENTION AND THE LAW—Harry A. Toulmin, Jr.—*Prentice-Hall*, 399 p., $5. Legal aspects of the basic principles of invention, for lawyers and others interested, with extracts from court opinions and decisions, and a thirty-page bibliography.

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Logic

LA LOGIQUE DE LA SCIENCE ET L'ÉCOLE DE VIENNE — Gen. Vouillemin, 45 p., 10 fr.; LE PROBLÈME DE LA LOGIQUE DE LA SCIENCE—R. Carnap, 37 p., 8 fr.; SUR LE FONDEMENT DE LA CONNAISSANCE—Moritz Schlick, 54 p., 10 fr.; LE DÉVELOPPEMENT DU CERCLE DE VIENNE ET L'AVENIR DE L'EMPIRISME LOGIQUE—Otto Neurath, 57 p., 10 fr.—*Hermann & Cie., Paris.*

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